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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/530,396	02/02/2006	Jose Munoz Leo	101689.56077US	5778
23911 7590 02/22/2010 CROWELL & MORING LLP INTELLECTUAL PROPERTY GROUP P.O. BOX 14300 WASHINGTON, DC 20044-4300			EXAMINER KIM, HEE-YONG	
			ART UNIT 2621	PAPER NUMBER
			MAIL DATE 02/22/2010	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/530,396

Applicant(s)

LEO, JOSE MUNOZ

Examiner

HEE-YONG KIM

Art Unit

2621

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 November 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 22-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 22-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 November 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S508)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

DETAILED ACTION

Response to Amendment

1. This office action is in reply to Applicant's Response dated November 30, 2009.
2. **Claims 1-21** has been cancelled.
3. **New Claims 22-37** have been added.

Response to Arguments

4. Applicant's arguments with respect to claims 1-21 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. **Claims 25, 27, and 35** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding **claim 25**, it cites a new claim limitation "a beam expander" at line 3 of the claim which has not been disclosed in the original specification and claims.

Therefore, it is a new matter.

Regarding **claim 27** and **35**, it cites a new claim limitation "M² parameter close to unity" which has not been disclosed in the original specification and claims. Therefore, it is a new matter.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. **Claims 22-26** are rejected under 102(b) as being anticipated by Ulitch (US 4,862,257), hereafter referenced as Ulitch.

Regarding **claim 22**, Ulitch discloses Imaging LIDAR System. Ulitch specifically discloses *A system for imaging the sea bottom (Fig.1 Imaging LIDAR System) from a submerged position (underwater vessel, col.2, line 20), comprising:*
a source of pulsed light (pulse, col.1, line 44) configured to emit a two-dimensional beam (expanded, col.1, line 46) of pulsed light;
an aiming/directing device (Projecting means for projecting, col.10, line 49-51) configured to direct the two-dimensional beam of pulsed light towards the sea bottom (at an object enveloped by the medium, col.9, line 47-49) ;
a solid-state detector (CCD Camera, col.1, line 48-49) having an internal two-dimensional array (inherent in CCD, because CCD camera consist of 2-D array of

CCD's) of individual photosensitive detectors (CCD) configured to generate electric current signals (inherent in CCD which converts light to electric signal) representing a two-dimensional video image (each CCD represents two-dimensional image pixel) from the two-dimensional beam of reflected pulsed light; and
an image intensifier tube (intensifier tube 50, Fig.4) having active gating control of a photocathode bias voltage (inherent in photocathode, col.5, line 1), the photocathode bias voltage configured to control (inherent in photocathode) the optical gain of the image intensifier tube and to selectively intensify or block (eliminates, col.2, line 61) the beam of reflected pulsed light to avoid the entrance of backscattered light (light scattered by the water in front of and behind target, col.2, line 61-62), the control being based at least in part on a known time (time delay, col.2, line 60) needed for the beam of pulsed light to travel to and from the sea bottom (round trip propagation to and from a target, col.2, line 57-62) .

Regarding **claim 23**, Ulitch discloses everything claimed as applied above (see claim 22). Ulitch further discloses further comprising:
a synchronization (electronically shuttered, col.2, line 59) electronic device configured to control the image intensifier tube (intensifier gating, col.7, line 46) to allow only the entrance of light reflected from the sea bottom (gating the cameras on at desired time for a given water depth, col.7, line 39-48); and
a signal processing device (sensor integration, col.7, line 46-47) configured to process the electric current signals received from the detector and to produce an image signal representing (sensor readout, col.7, line 47) the sea bottom.

Regarding **claim 24**, Ulitch discloses everything claimed as applied above (see claim 23). In addition, Ulitch discloses *further comprising*:

a monitor screen (Monochrome and Color Video Monitors, Fig.6) configured to receive the image signal representing the sea bottom (Signal from Camera to Monitor, Fig.6) and to display a video image of the sea bottom (inherent).

Regarding **claim 25**, Ulitch discloses everything claimed as applied above (see claim 22). In addition, Ulitch discloses *wherein the source of pulsed light includes a laser (Pulsed Laser 10, Fig.1), and a beam expander (Expanded by Optics, col.1, line 46) configured to receive light from the laser (inherent) and produce the two-dimensional expanded beam (expanded, col1, line 46).*

Regarding **claim 26**, Ulitch discloses everything claimed as applied above (see claim 22). In addition, Ulitch discloses *wherein the laser source operates in the blue-green region (green (532 nm), col.4, line 1) of the visible spectrum.*

9. **Claims 30-33, and 36-37** are rejected under 102(b) as being anticipated by Caimi (US 5,418,608), hereafter referenced as Caimi.

Regarding **claim 30**, Caimi discloses Three Dimensional Mapping Systems and Methods. Caimi specifically discloses *A system for imaging the sea bottom (Fig.1 3D mapping system) from a submerged position (submarine ROV, col.3, line 50), comprising:*

a source of pulsed light (Laser 30, Fig.1) configured to emit a concentrated beam (single beam to produce a single dot image, col.3, line 7) of pulsed light (pulsed laser, col.5, line 3) illuminating a single point (single dot, col.3, line 7);

an aiming/directing device (X and Y motors and Optics, col.7, line 3-12) configured to perform a two-dimensional scan (two dimensional scan, col.3, line 12-13) of a portion of the sea bottom (target surface, col.3, line 8) with the concentrated beam of pulse light (single beam, col.3, line 7) from a single location (single dot image, col.3, line 7); a single photodetector (Position Sensitive Photodiode, col.3, line 21) configured to generate a sequence of current pulses (integrate sensor current, col.10, line 13-14) of temporal characteristics (raster fashion, col.3, line 9) similar to temporal characteristics of a reflected pulsed light (reflection at the target, col.3, line 8) generated by the two dimensional scan (two dimensional scan, col.3, line 12-13); and an image intensifier tube (photomultiplier tube, col.5, line 20) having active gating control of a photocathode (photocathode is inherent in photo multiplier) bias voltage (voltage to gating electrode, col.8, line 19), the photocathode bias voltage configured to control the optical gain (inherent, by using bias voltage) of the image intensifier tube and to selectively intensify (amplify, col.8, line 22) or block the beam of reflected pulsed light (block the light, col.4, line 53) to avoid the entrance of backscattered light (light from reaching PSD until a return from the target), the control being based at least in part on a known time needed for the beam of pulsed light to travel to and from the sea bottom (round trip delay time of light from light source to datum, col.4, line 54-59).

Regarding **claim 31**, Caimi discloses everything claimed as applied above (see claim 30). Caimi further discloses *further comprising:*
a synchronization (range gating, col.4, line 52) electronic device configured to control the image intensifier tube (photomultiplier tube, col.5, line 20) to

allow only the entrance of light (gating, col.5, line 18) reflected from the sea bottom (light signal reflected onto PSD from the datum surface, col.7, line 18-26); and a signal processing device (sensor integration, col.7, line 46-47) configured to process the electric current signals (ADC/Signal Processing/DAC board 12, Fig.7) received from the detector and to produce an image signal (amplified light signal is imaged, col.5, line 24) representing the sea bottom.

Regarding **claim 32**, Caimi discloses everything claimed as applied above (see claim 31). In addition, Caimi discloses *further comprising: a monitor screen (Monitor 54, Fig.1) configured to receive the image signal representing the sea bottom (inherent in ADC/Processing board, col.11, line 19-22) and to display a video image of the sea bottom (inherent in VGA Graphics Controller and Graphics Board Set, col.11, line 28-32).*

Regarding **claim 33**, Caimi discloses everything claimed as applied above (see claim 30). In addition, Caimi discloses *wherein the source of pulsed light is a laser (pulsed laser, col.5, line 3).*

Regarding **claim 36**, Caimi discloses everything claimed as applied above (see claim 30). In addition, Caimi discloses *wherein the aiming/directing device includes at least one of galvanometric mirrors (galvanometer motor driven mirrors, col.7, line 31-32), electro-optic deflectors or acousto-optic deflectors (Acousto-Optic Modulator, col.7, line 5).*

Regarding **claim 37**, Caimi discloses everything claimed as applied above (see claim 30). In addition, Caimi discloses *wherein the photodetector includes at least one*

of a photomultiplier tube (photomultiplier tube, col.5, line 20), *a photodiode* (Position Sensitive Photodiode (PSD), col.3, line 21) *or an avalanche photodiode*.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. **Claims 28-29** are rejected as being unpatentable over Ulitch in view of Harris (University of Berkeley, Document No. 8804-W7A), hereafter referenced as Harris.

Regarding **claim 28**, Ulitch discloses everything claimed as applied above (see claim 22). Ulitch further discloses *wherein the solid state detector is a solid-state TV camera detector* (CCD Camera 18 and 20, Fig.1) *and wherein the image provided by the image intensifier tube* (image intensifier 50, fig. 4) *is coupled to the solid- state TV camera detector* (CCD 46, Fig.4) *by electron bombardment* (inherent in CCD) *of the array of individual photosensitive detectors* (CCD features 568 lines by 382 columns, col.5, line 27) *of the camera*. However, Ulitch fails to disclose *wherein the solid state detector and image intensifier are integrated in a single device*.

In the similar field of view, Harris discloses CCD Fiber Optic Bonding Specification. Specifically Harris discloses integration of Intensifier and CCD camera by bonding together in Fig. 3-1.

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Ulitch by providing *integrating the image intensifier and the camera in a single device*, for the purpose of compactness of a detection system. The Ulitch system, incorporating the Harris CCD Fiber Optic Bonding, has all the features of claim 28.

Regarding **claim 29**, Ulitch discloses everything claimed as applied above (see claim 28). In addition, Ulitch discloses *wherein the solid-state TV camera detector* (CCD Camera 18 and 20, Fig.1) *includes at least one of CCD* (CCD sensor, col.5, line 5) *or CMOS detectors*.

12. **Claim 34** is rejected under 103(a) as being unpatentable over Caimi in view of Schmitschek (US patent 4,229,711), hereafter referenced as Schmitschek (US 4,229,711).

Regarding **claim 34**, Caimi discloses everything claimed as applied above (see claim 33). However Caimi fails to disclose *wherein the laser source operates in the blue-green region of the visible spectrum*.

In the similar field of view Schmitschek discloses Metal Dihalide Photodissociation Cycle Laser. Specifically Schmitschek discloses that the blue-green wavelength is known to be best transmitted through ocean waters (column 2, line 40-44.)

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Caimi by specifically providing *wherein the laser source operates in the blue-green region of the visible spectrum*, for

the purpose of having least light attenuation. The Caimi system, incorporating the Schmitschek blue-green laser, has all the features of claim 34.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure, because they are related to the subject matter, underwater imaging.

- Jules Jaffe et al., "Underwater Optical Imaging: Status and Prospects", Oceanography Vo. 14, No.3, pp 64-75, 2001

- John Klepsvik et al., "A Novel Laser Radar System for Subsea Inspection and Mapping", Oceans '94. 'Oceans Engineering for Today's Technology and Tomorrow's Preservation.' Proceedings, Sep. 1994

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HEE-YONG KIM whose telephone number is (571)270-3669. The examiner can normally be reached on Monday-Thursday, 8:00am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha Banks-Harold can be reached on 571-272-7905. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HEE-YONG KIM/
Examiner, Art Unit 4192

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/Marsha D. Banks-Harold/

Supervisory Patent Examiner, Art Unit 2621

/Andy S. Rao/

Primary Examiner, Art Unit 2621

February 12, 2010